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VPU3400 USER'S MANUAL

Version 1.1

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Guidance on Safe Use

- Power supply：It's essential to use single phase three -wire system power supply with ground protection. Users should make sure that the whole system is protected under the same ground protection. Ungrounded power supply must NOT be used and the earth pin of the power supply must not be damaged!
- Power cut-off：Users should make sure that all power is cut off before any movement of the facilities or any other work that would require power cut-off. This includes disconnecting all external power cables, unplugging power cords from wall sockets. The purpose of this is to ensure personal safety.
- Cables and Wires：Please prevent from trampling, squeezing or putting any items on the power cables, signal cables and other communication wires to avoid the danger of leakage or short circuit.
- Signal connection：Power should be cut off before any plugging or unplugging of the signal cables and wires from the facilities to avoid breakdown of the electronic circuit. **Damages caused by charged plug-in or pull-out are not eligible for warranty.**
- Radiation louver：Please keep the radiation louver on the cover or the bottom of the cabinet clear of any stuff. Blocking of the radiation louver may increase the interior heat and damage the facilities.
- Fixing the equipment：All equipment should be reasonably arranged and securely fastened in order

to prevent any dropping of the equipment.

- Environment：Dust-proof and moisture-proof are required for the working environment of the equipment.
- Maintenance：All maintenance work must be done by qualified personnel only. Any inadvertent attempt to open the cabinet may cause serious hazards, like electric shock to the operator.

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1. Introduction to VPU3400

The VPU3400 is a specially designed video processor for synchronic LED display. It is an image processor that can scale up and down the VGA and video images. It also does the signal selection. With the new technology of high precision A/D conversion and automatic noise reduction as well as the capability of changing from interlace to progressive scanning, the VPU 3400 boasts the function of putting out excellent video signal with high definition. The input signals can be YPrPb, CVBS, S-Video, VGA, HDMI, SDI/HD SDI or DVI, while the output signals are DVI signal and can be transmissed via optical fibe.

- More advanced scaling up and down algorithm and non-interlacing algorithm
- 10 digits processing
- All parameters can be adjusted, such as the brightness and contrast of input video signals, etc.
- supports high-definition input and output.
- supports display ratio conversion.

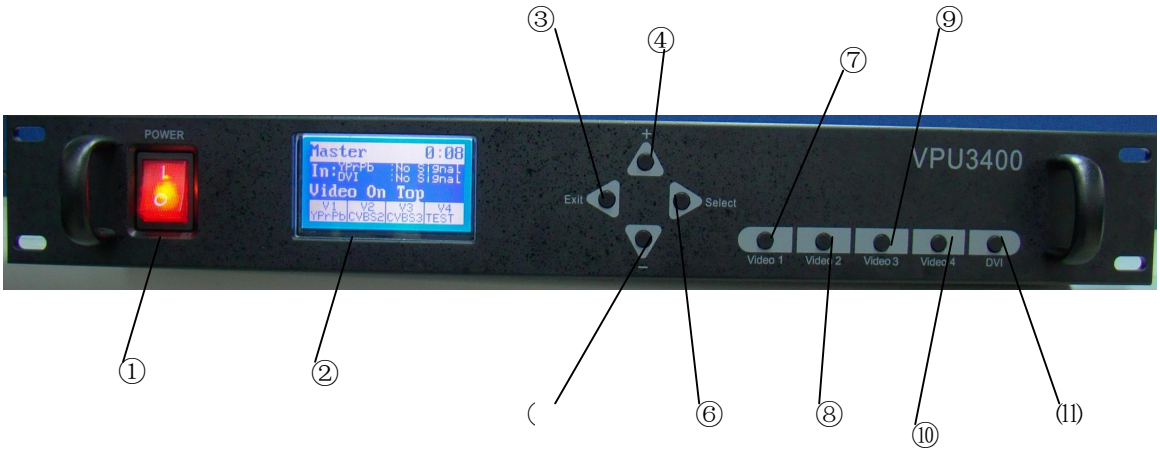
- The video com port has 3 CVBS3 input channels, 1 YprPb input channel, 1 S-Video input channels, 1 SDI input channel and 1 HDMI input channel;
- The image com port supports digital DVI1.0 standard or analogue VGA input. The maximum input resolution is 1080X1920X60Hz；
- It is compatible with NTSC & PALSECAM standard, and thus can automatically identify NTSC and PALSECAM signals；
- It supports individual adjustment of video saturation and grey level；
- It is capable of self-scaling to whole screen size,and supports zooming at any rate;
- It supports 6 display modes, including DVI, Video, DVI-Added-on-top, Video-Added-on-top, Blending and Caption Machine, etc.;
- It provides digital DVI output. Max output resolution can be up to1024X768X60Hz. It can be connected to DVI devices; it can also be connected to an LCD monitor.
- Inbuilt 128x64 dot matrix LCD display and 9 buttons are found on the operation panel. English and Chinese operating interfaces are both available. Users can operate by using the operation panel according to the operating menu and reminders shown on the LCD.

- Auto and manual brightness adjustment available;
- Color temperature can be defined and selected by different users.
- Two 2.25G multi-modal optic fiber output channels, each supports 1920（C）X1080（R）pixels within a communication distance of 500m.
- It supports the PC software control via USB1.1 and Ethernet. Protocols are available upon request;
- Working voltage: 100V~240V. Power consumption: < 20W. Ambient temp: -10~45℃ Ambient humidity: 10%～90%.
- Dimension: HXWXD = 62.5mmX483mmX363.5mm.

2. VPU3400 Connection

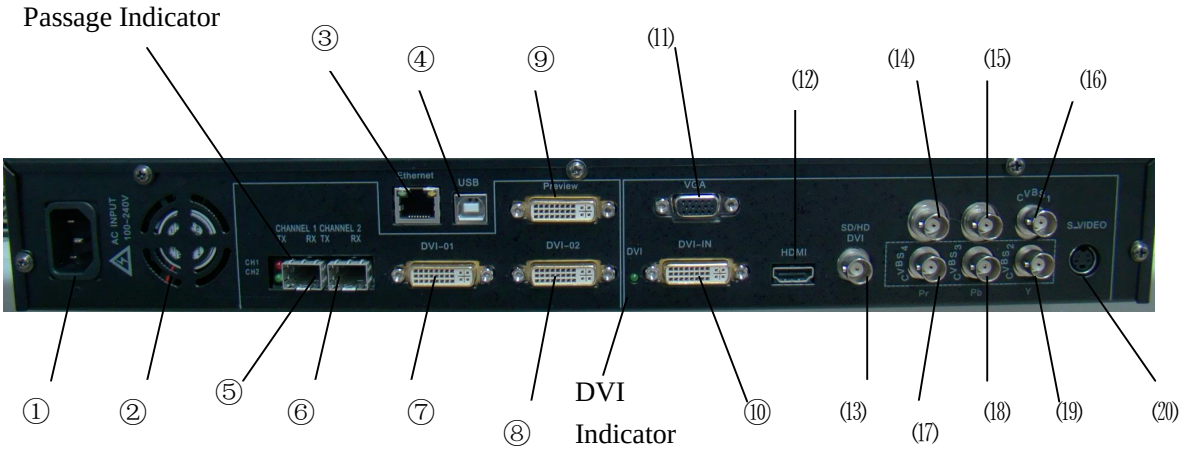
2.1 Description of the front-panel and interface of VPU3400

Description of the front-panel and functions of each button



1	AC 220V/110V Power switch.
2	LCD display panel. It shows basic information of the operating interface.
3	"Exit", Exit from the current menu and return to the previous menu.
4	"+", Upward selection of the menu. In parameter setting, it is the increase operation.
5	"-", Downward selection of the menu. In parameter setting, it is the decrease operation.
6	"Select", Enter the functional menu or confirm the current selected function.
7	"Video1", shortcut key 1 of the video source selection. Used to select from one of the 7 input video sources defined by the users.
8	"Video2", shortcut key 2 of the video source selection. Used to select from one of the 7 input video sources defined by the users.
9	"Video3", shortcut key 3 of the video source selection. Used to select from one of the 7 input video sources defined by the users.
10	"Video4", shortcut key 4 of the video source selection. Used to select from one of the 7 input video sources defined by the users.
11	"DVI", DVI input shortcut key.

Description of the back-panel and connections of VPU3400



1	Power supply input: AC110V/220V		
2	Ventilation fan outlet		
3	Ethernet com port to the PC		
4	USB port to the PC		
5	Data Output		"CHANNEL1": Optical fiber output port. It is connected to LDU3000 for data transmission.
6			"CHANNEL 2": Optical fiber output interface. It is connected to LDU3000 for data transmission.
7			"DVI", DVI output port. It can be connected to the LCD or any other display as the monitor in the control room.
8			"DVI", DVI output port 1
9			"DVI", DVI output por 2
10	Video data input	Passage 1	"DVI": DVI video input
11		Passage 2	"VGA": VGA video input
12			"HDMI" video input
13			"SDI" video input
14			"CVBS 3" video input
15			"CVBS 2" video input
16			"CVBS 1" video input

17			"Pr" video input
18			"Pb" video input
19			"Y" video input
20			"S-Video" Video input

Notes:

1）There are two video input channels in VPU 3400. Each channel accepts one video signal input. When different video signals are fed to the processor at the same time, the user can get the function of "Picture In Picture" .

2）There are two optical fiber connections for the data output. One is for data transmission, while the other is for cascade output..

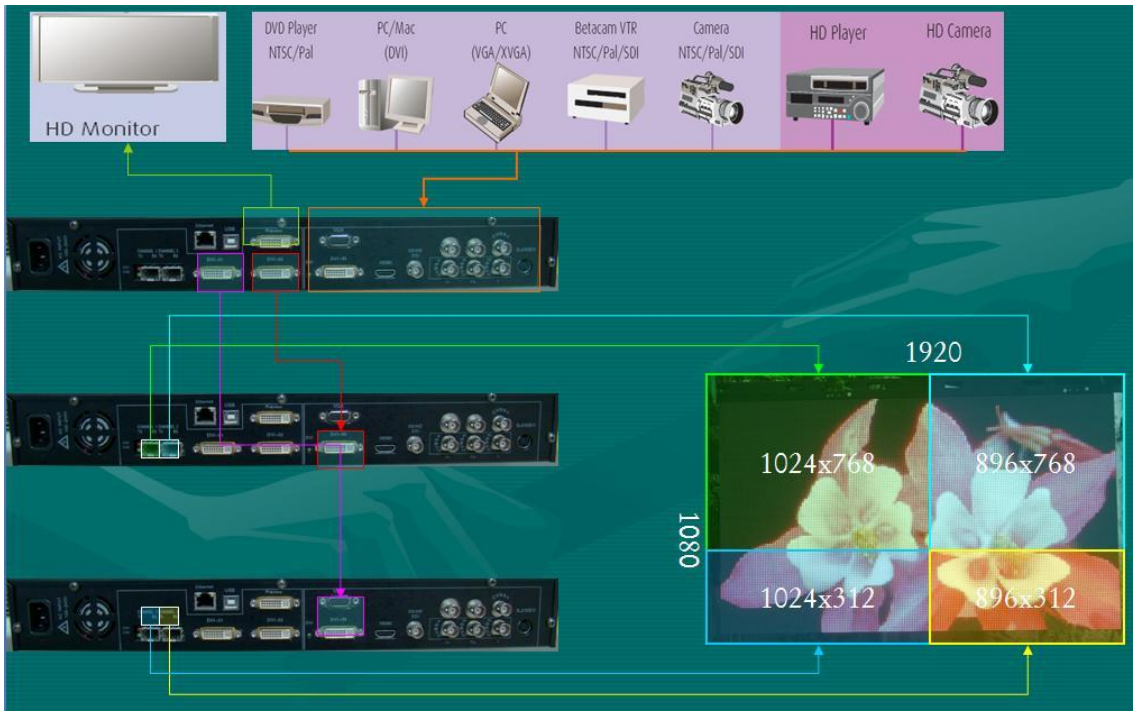
3) Optical fiber access indicator: When the indicator is on, the access is under normal working status

4) DVI indicator: When the indicator is on, the DVI is under stable working status.

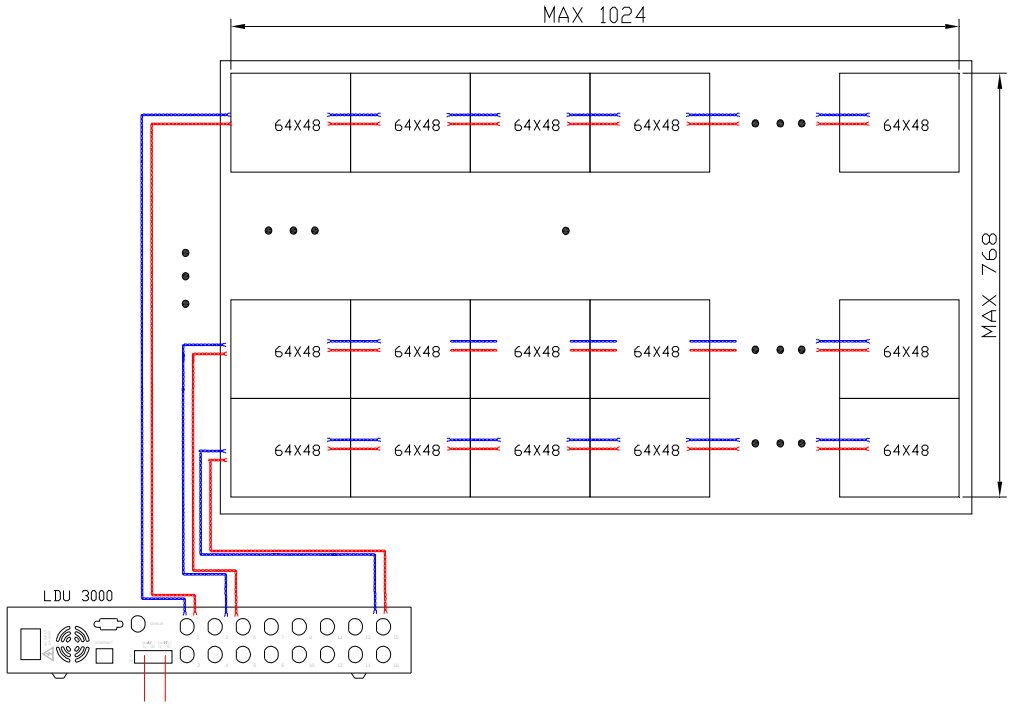
2.2 System Block Diagram

The VPU3400 can process multiple video signals. It is connected to the LED control system LDU 3000 through an optical fiber. Signals like DVD, DC and TV signal should be connected to the video source input port of VPU3400, while DVI signal should be connected to the image port of VPU3400. Operation and parameter setting are done through the RS-232 port communication or operation on the front panel of the VPU3400. VPU3400 send data to LDU3000 via an optical fiber cable. Then LDU3000 will dispatch the data to the control board in each cabinet in order to control the whole screen.

The picture below is a wiring diagram when VPU3400 controls a screen with the resolution of 1080x1920:



Please see signal output via optical fibre to LDU3000 and how LDU3000 is connected to the screen as follows:



Notes:

In the drawing there are 64x48 pixels on each cabinet. Under different circumstances, our company may deliver cabinets with different pixel configurations.

In the drawing, the red wire stands for the data transfer, the blue wire stands for the communicating

direction.

3. Basic Functions and Operations of VPU3400

3.1 Selection of video source

Before hands-on operation, we should recognize the interface below, which is shown on the LCD when the VPU3400 isunder normal working circumstances.

Current video source: "YPrPb"; Users can select different video sources according to their actual need.

Current time: "0:12"

Current display mode: "DVI only";

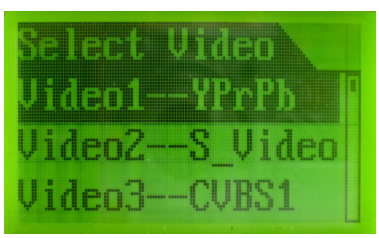
Current customer self-defined shortcut video source: "V1：YPrPb"、 "V2：S-Video"、 "V3：CVBS1" and "V4：CVBS2"

Video source

The video sources include YprPb, S-Video, CVBS1, CVBS2, CVBS3, VGA, SDI and HDMI. Please refer to the explanation on the back panel on VPU.

Selection of the Video Source

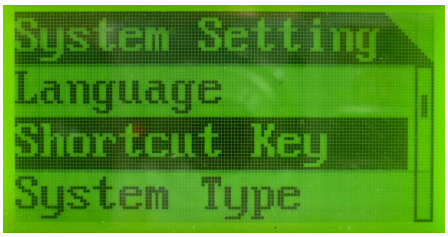
Steps to select a video source: Enter the function menu → Choose "Select Video" → Select the video source

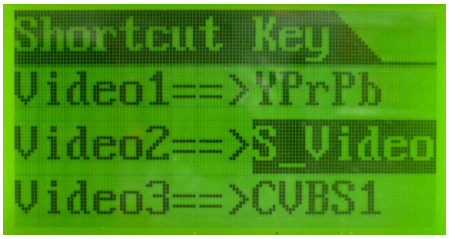


Properly set a video signal input on the equipment according to the video signal connection.

Shortcut Key Setting of the Video Source and Selection

Steps of the Shortcut Key Video Setting: Under the normal working status interface, press the "Selection" button to enter the function menu. Then choose the "System setting" by using the upward or downward button. And then enter "Shortcut key". Users can define the shortcut key for the video source under the "Shortcut key" menu as "Video1"、"Video2"、"Video3" and "Video4".





After the correct setting, users can quickly switch among the video source by using these shortcut keys Video1", "Video2", "Video3" and "Video4" in the front panel.

3.2 Selection of the Display Modes

There are six display modes----"DVI", VIDEO, "Picture in picture-DVI on top", "Picture in Picture-video on top", "Blending" and "Title Generator".

Usually, the user can choose the display modes of either Video mode or DVI mode. Then the user can choose "Blending", "Title Generator" or "Picture in Picture" according to their needs. Please note that under such circumstances, one of the two input signals must be DVI signal, while the other must be the video signal.

Steps of setting the display mode: Enter the function menu→ Choose "Set mode" → Choose the needed display mode.

User can select any of the five display ---"DVI Only", "Video Only", "PIP-DVI on Top", "PIP-Video on top", "Blending" and "Title Generator"**.** The following interface will show up after the selection.

Below is one DVI output "PIP" example that is taken out from the LCD monitor. The 720x480 dotted line frames represent a LED display. On this display, there is a 360x480 video window (shown on the right) and a 360x480 image window (shown on the left).

3.3 Brightness Adjustment

There are two ways for the user to adjust the brightness—auto & manual adjustment. Under manual adjustment, the percentage of brightness that the user can choose ranges from 10~100%. Under auto adjustment, the system of the display will modify the brightness according to the situation of the environment. The user should pre-set the brightness percentage if they choose auto adjustment: Min (10-50%), Max（30～100％）. The distance between the minimum value and the maximum value is the range of brightness adjustment. Please don't exceed the max percentage when selecting the min parameter.

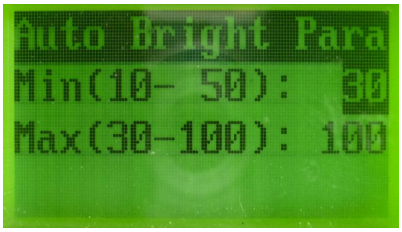
Steps of brightness adjustment: Enter function menu→ Choose "Set Brightness"→ Choose the needed brightness adjustment, which is shown below.

1) Select "Manual" adjustment to enter the following interface.

The user can press "+" or "-"to adjust the brightness and confirm it by the "Select" button.

2) Select Set Auto to enter automatic brightness

3) Parameters of the "Set auto a Para"



The user can press "+" or "-"to adjust the brightness and confirm it by the "Select" button.

Note: The percentage of Max brightness should be larger than that of the min percentage.

4. VPU3400 Advanced Setting

4.1 To Set the Coordinates and the Display Window

4.1.1 To Set the Parameters of the Equipment

Parameters of the device include parameters of "Set Screen Size", "Set VPU Para", and the "Set LDU Para".

Generally speaking, the users will have to set these parameters only when the VPU3400 is being commissioned for the first time or is being initialized. After that, no more setting is required.

Steps to set parameters of the Device: Enter the function menu→ Select "Set Device"→ Set the parameter of each sub-menu.

1）Set the "Set LDU Para", including the LDU number and the coordinates. The setting interfaces are just as the following figures show.

2） Setting the "Set VPU Para": It includes setting the parameters of the video "Preview" and "Ch2 X Start". The operating interface is shown below:

This parameter is mainly for "Ch2 X Start" setting of cascading.

System default setting:

Preview: Disable

Ch2 X Start: 0

4.1.2 To Set the Display Window of the LED Screen

When users operate the VPU DVI signal and the video signal VPU for the first time, users should set the size of the window and initial position. In this case, users will be able to determine whether to display DVI signal or display video on the screen.

1. Steps of Setting the Video Window:

1）"Set window"→ Enter the interface of " **Video window**"."

2）Under this interface, there is illustration on the left showing the specific definitions of the values for **X**，Y，W，H

Users can set the values according to their needs.

2. Steps of creating the DVI display window:

1）"Set window"→ Enter the interface of "DVI window"

2）Under this interface, there is illustration on the left showing the specific definitions of the values for **X**，Y，W，H.

Users can set the values according to their needs.

4.2 Setting Video Zoom Window

When the video display window is different in size from the size of the video signal, the VPU3400 can compress and expand the video signals to match the exact screen size.

VPU3400 provides 6 zooming modes：namely 16:10，16:9，5:4，4:3，3:2

The definitions are：

1） Full screen. This is to match the video signals to the exact size of the video display window.

2） To ratio. This is to display the video signals according to desired screen ratio.

Setting the video zoom mode: Enter the Function menu➔Select **"Display ratio"**➔Select desired zoom mode. Enter video zoom mode menu. See the following figure：

4.3 Setting Video Parameters

The VPU3400 can adjust such parameters as brightness, contrast and hue on the input video signals. Different display effect can be achieved through such adjusting.

Steps to set video parameters：Enter the Function menu➔ Select "**Set video paramters**"➔

Select desired parameter ➔set the parameter.

You can eliminate redundant data, such as unrequired black border on four sides.

VPU3400 provides a default factory value restoration function. In most cases, the default parameters can allow you achieve fairly good display effects.

Steps to restore default video parameters：Enter the Function menu ➔ Select **"Set Video Parameter"**➔ Select "**Restore Default Values**".

Video Parameters

- Brightness 50
- Contrast 50
- Hue 0
- Saturation 50
- Sharpness 8
- Eliminating Unused Data (Bad Cut)0，0
- Restoring Default Value

4.5 Setting the Screen's Color Temperature

The color temperature includes 6500K, 9300K and self-defined.

The user can set the color temperature of the LED sign to be any of the following three: 6500K or 9300K. He can even define his own desired color termparature.

Steps to set color temperature： Enter the Function menu➔ Select **"Set Color Temperature"**➔ Select desired color temperature or your self-defined color temperature, such as shown in the following figure

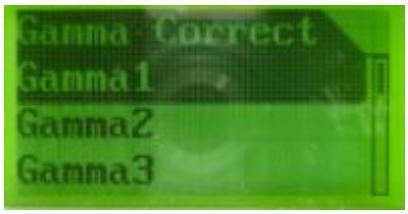
If you are selecting either of the prepared two color temperature modes, you needn't other settings. You can directly choose either one. If you want to define a color temperature on your own, you need to set the value of each of the basic colors R, G, and G, as shown in the following figure.

4.6 Gamma Correction Selection

You can use the VPU3400 to perform Gamma correction to achieve different display effects.

The VPU3400 has 4 groups of gamma correction data pre-set in the machine. The user can select a desired data group for optimum display effect.

Steps to set Gamma correction：Enter Function menu➔ Select "**Gamma correction**" menu➔ Select Gamma correction data. See the following figure.



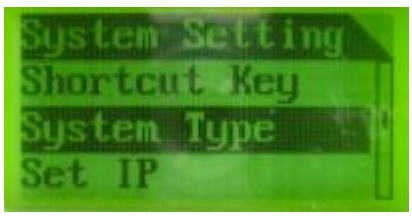
4.7 System Setting

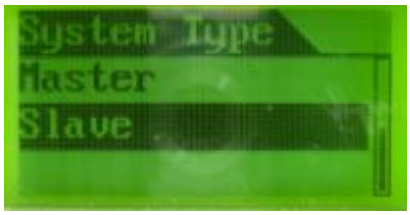
4.7.1 Setting System Type

Setting system type：Master sign or slave (in a multiple-VPU system).

Sometimes you need to use more than one video processor to process the video signals. When you use three VPU3400s, for example, you need to set one VPU3400 as the master machine and two other VPU3400s as slave machines. Accordingly, you also need to set the starting column in the second channel in each slave VPU3400.

Steps to set system types：Enter Function Menu ➔Select "System Setting" menu➔ Select "System Type" menu➔ Select master or slave. See figure.

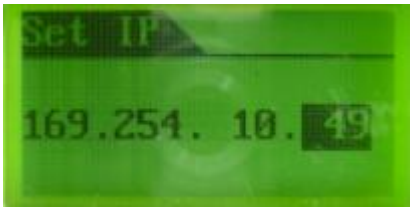




4.7.2 IP Setting

Set the Ethernet IP for the VPU communication.

Steps to set IP：Enter Function menu➔ Select "System Setting" menu➔ Select "**Set IP**" menu. See the following figure.



5. VPU3400 Maintenance and Others

5.1 Checking Basic Information

We can check some of the most basic information about the video processor VPU and even the signal distributor LDU by looking up the VPU3400. This information include：

1）CPU version number of the VPU, FPGA firmware version number, serial number and IP address.

2）ID number of the VPU.

Steps to obtain information：Enter menu "System Information"➔ Select VPU information ➔ select desired information.

5.2 VPU3400 Self Diagnosis

When the VPU3400 is unable to work normally, you can use the system self diagnosis function to pinpoint the trouble.

Steps to perform self diagnosis：

1）Use a DVI signal cable to connect the input and output terminals of the VPU3400.

2）Enter menu "System Setting"➔"System Test"➔ Check the test result.

5.3 Save the Current Setting to Factory Default Value

VPU3400 can save the current setting to as factory default value. This function is useful when the user has disrupted the settings of the VPU3400. He can reset to factory default values so that the system can work according to the original setting.

Steps to set the current setting as the factory default value：

1） Put the VPU3400 under normal work condition.

2） Press the two buttons "**EXIT** " and "**DOWN**" for about 1 second.

3） When a prompt pops up on the VPU3400, press the button "**Select**".

5.4 To Resume Factory Default Values

Steps to restore the factory default values：Enter menu "System Setting"➔"Load Default"➔ VPU3400 prompt. Press "**Select**" button.

6. Steps to Initialize the VPU3400

STEP1. "Set equipment parameters"➔"Set LDU parameters"➔"LDU quantity". Set the total units of LDU used in the LED display system➔ Exit

STEP 2. "Set display window"➔"DVI display window"➔ Set X，Y value to be 0. Set W to be the screen width, H to be the screen height.➔ Exit

STEP 3. "Set display mode"➔"DVI"➔ Exit

STEP 4. Open the screen positioning software. Check if the four sides of the screen have white borders. If you see white borders, jump to Step 7.

STEP 5."Set equipment parameters"➔"Set LDU parameters"➔"LDU coordinates". Adjust the coordinates of the LDU until you see white border on all four sides of the LED screen.

STEP 6. Open a window or multiple windows according to requirements. Select video source, and set display modes.